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CONCHOLOGICAL VARIABILITY OF *ANADARA INAEQUIVALVIS* (BIVALVIA, ARCIDAE) IN THE BLACK–AZOV SEA BASIN

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Conchological Variability of *Anadara inaequivalvis* (Bivalvia, Arcidae) in the Black-Azov Sea Basin. Anistratenko, V. V., Anistratenko, O. Yu., Khaliman, I. A. — An alien species in the Black Sea and the Sea of Azov — *Anadara inaequivalvis* (Bruguiere, 1789) — was recently discovered to have a wide range of shell variability. From the investigated samples (over 900 valves) six basic types of the shell commissural opening were defined; they are not, however, discrete conditions. The presence of intermediate variants reveals a gradual (continuous) character of the shell variability and indicates that all the samples investigated belong to the same species. The variation of some other *Anadara* characteristics is also discussed, including: quantity and ornamentation of the ribs on the surface of the valves, quantity of chevrons on the ligament area, shape of the hinge plate and quantity of hinge teeth. A comparison of conchological characteristics of *Anadara* from the Black–Azov Sea Basin with *A. inaequivalvis* from southeast India shows that ranges and patterns of shell variability of Azov-Black Sea *Anadara* correspond to variability of *A. inaequivalvis* from this species type locality — Coromandel Coast of India.

Key words: Bivalvia, *Anadara*, shell morphology, the Black Sea, the Sea of Azov.

Конхологическая изменчивость *Anadara inaequivalvis* (Bivalvia, Arcidae) в Азово-Черноморском бассейне. Анистратенко В. В., Анистратенко О. Ю., Халиман И. А. — Показан широкий диапазон изменчивости раковины *Anadara inaequivalvis* (Bruguière, 1789) — вида-вселенца в Азово-Черноморском бассейне. В изученном материале (более 900 створок) выделены 6 основных форм комиссурального просвета раковины, которые, однако, не являются дискретными состояниями. Наличие промежуточных вариантов свидетельствует о плавной (непрерывной) изменчивости и принадлежности всех изученных популяций к одному виду. Обсуждается варьирование некоторых других признаков раковины *Anadara*: количество и скульптированность рёбер на поверхности створок, количество шевронов на лигаментной площадке, форма замочного края и количество зубов замка. Сопоставление морфологических характеристик раковины *Anadara* из Чёрного и Азовского морей и *A. inaequivalvis* из юго-восточной Индии подтверждает, что границы и характер изменчивости моллюсков рода *Anadara*, обитающих в азово-черноморском бассейне, вполне соответствуют изменчивости *A. inaequivalvis* из типовой местности — Коромандельского побережья Индии.

Ключевые слова: Bivalvia, *Anadara*, морфология раковины, Чёрное море, Азовское море.

Introduction

Over 40 years ago in the Mediterranean Sea at the Italian coast off Ravenna a new alien bivalve mollusk of the genus *Anadara* Gray, 1847 has been registered. The species got into adjacent areas soon (Ghisotti, 1972; Rinaldi, 1972; Ghisotti, Rinaldi, 1976; Nolf, 2010). Mollusks of this group belong to the family Arcidae Lamarck, 1809 (subfamily Anadarinae Reinhart, 1935) and are, mainly, inhabitants of the tropical and subtropical seas.

It is considered that in the Black Sea this mollusk was found for the first time in 1981 in coastal areas of Bulgaria and on a shelf of Romania (Zolotarev, Zolotarev, 1987). However, according to data published by M. I. Kiseleva (1992), the first finding of this species in the Black Sea should be dated 1968, i. e. practically the same time as that in the Adriatic Sea. It is possible that introduction of *Anadara* could happen independently to different basins and/or different sites within the same basin suitable for its habitation. The colonization history of the Black-Azov Sea Basin by this mollusk was reviewed previously (Anistratenko, Khaliman, 2006); so far *Anadara* inhabits in the Black Sea along the entire coast (Sahin et al., 2009), and in the Sea of Azov it occupied its southern, western and partially northern sectors (Anistratenko et al., 2011).

In the majority of publications (Rinaldi, 1985; Poppe, Goto, 1993; Anistratenko, Khaliman, 2006; Sahin et al. 2009; Finogenova, 2011) the Mediterranean *Anadara* as well as those in the Black Sea and the Sea of Azov is assigned to *A. inaequivalvis* (Bruguière, 1789). Meanwhile, recent substantial data on conchology of *A. inaequivalvis* from the southeast coast of India, a district close to the type locality of the species concerned (Lutaenko, 2006), were published. Comparison of some conchological characters of *Anadara* from the Mediterranean and the Black Seas makes the author to doubt on the belonging of these mollusks to the true *A. inaequivalvis*.

The solution of the problem of *Anadara* species identification that immigrated to the Mediterranean Basin depends on the study of the variability of its shell in new to this species conditions, in particular. As far as it can be concluded from the publications, the majority of Anadarinae are not well studied in this respect (Lutaenko, 1993, 2006). Only few works are devoted to variability of *Anadara*, for instance, in the northwestern part of the Sea of Japan (Lutaenko, 2002).

The present study focuses on shell variability of *Anadara* inhabiting the Black-Azov Sea Basin. For comparison, the materials by K. A. Lutaenko (2006) on conchology of *A. inaequivalvis* and some related nominal species of *Anadara* from the southeast India are discussed.

Material and methods

Material for the present study was collected from coastal casts of the Black Sea and the Sea of Azov from 1989 to 2012 (fig. 1). The Black Sea material is presented by 17 specimens from the coast of the Caucasus near Pichory village (Gali District, Abkhazia), three specimens are from the settlement Chakvi (Adzharia); about 800 valves were collected within the borders of cordon "Morskoy" of the Black Sea Biosphere Reserve (BSBR, Golopristan' District, Kherson Region, Ukraine). The main material from the Sea of Azov (about 500 specimens) was collected along the sea side of Fedotova Spit (Kirillovka settlement, Akimovka District, Zapori-

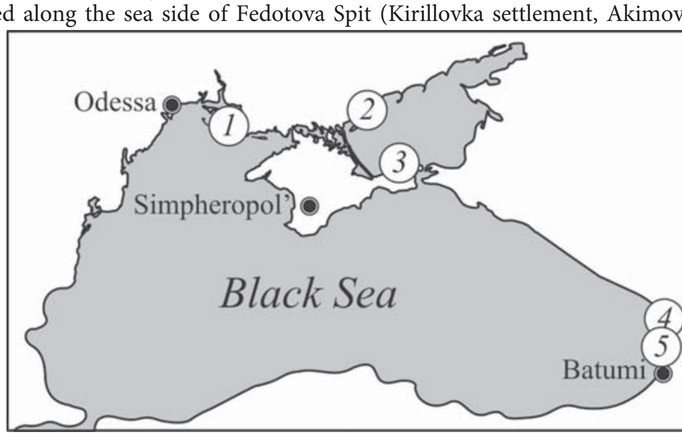


Fig. 1. Localities in the Black Sea and the Sea of Azov where the samples were collected: *1* — Cordon "Morskoj", the Black Sea Biosphere Reserve (BSBR), Gola Prystan District, Kherson Region, Ukraine (46°07´54″ N, 32°13´39″ E, 2011 and 2012, coll. V. V. Anistratenko and O. Yu. Anistratenko); *2* — Fedotova Spit in the vicinity of Kirillovka settlement, Akimovka District, Zaporizhzhya Region, Ukraine (46°19´40″ N, 35°20´03″ E, 2005, 2006, 2012, coll. V. V. Anistratenko, O. Yu. Anistratenko and I. A. Khaliman); *3* — Yurkino settlement, Lenino District, Crimea, Ukraine (45°25´24″ N, 36°33´15″ E, October 12, 2003, coll. V. V. Anistratenko and O. Yu. Anistratenko); *4* — Pichory village, Galy District, Abkhazia (42°26´57″ N, 41°32´30″ E, June 22, 1989, coll. V. V. Anistratenko); *5* — Chakvy settlement, Adzharia (41°44´05″ N, 41°43´57″ E, June 21, 1989, coll. V. V. Anistratenko).

Рис. 1. Места сбора материала в Чёрном и Азовском морях: *1* — кордон «Морской», Черноморский биосферный заповедник, Голопристанский р-н, Херсонская обл., Украина (46°07´54″ N, 32°13´39″ E, 2011 и 2012 гг., сбор В. В. Анистратенко, О. Ю. Анистратенко); *2* — Федотова коса возле пос. Кирилловка, Акимовский р-н, Запорожская обл., Украина (46°19´40″ N, 35°20´03″ E, 2005, 2006, 2012 гг., сбор В. В. Анистратенко, О. Ю. Анистратенко, И. А. Халиман); *3* — пос. Юркино, Ленинский р-н, АР Крым, Украина (45°25´24″ N, 36°33´15″ E, 12 октября 2003 г., сбор В. В. Анистратенко, О. Ю. Анистратенко); *4* — с. Пичори, Галийский р-н, Абхазия (42°26´57″ N, 41°32´30″ E, 22 июня 1989 г., сбор В. В. Анистратенко); *5* — пос. Чакви, Аджария (41°44´05″ N, 41°43´57″ E, 21 июня 1989 г., сбор В. В. Анистратенко).

zhzhya Region, Ukraine), about 50 other specimens came from the Sea of Azov coast of the Kerch Peninsula (Yurkino settlement, Lenino District, Crimea, Ukraine). Additionally, some specimens from coastal area of the Kerch Strait were studied, namely, from Tuzla Spit, Ak-Burun Cape and Opuk Cape, kindly provided by Yu. V. Vernigorova and T. V. Shevchenko (Institute of Geological Sciences of NAS of Ukraine, Kyiv).

Shell shape variability of *Anadara inaequivalvis* was estimated based on a variety of an outline joining, i. e. of a shell's commissural opening. For this purpose we specially selected and studied 508 discrete valves (259 left and 249 right) from the BSBR and 400 valves (200 left and 200 right) from the Fedotova Spit (all collected in 2012). In specimens with two valves, only one of them was considered, thus, each valve considered has to be considered as an individual specimen. Comparison of the shell shape was carried out as follows. On a transparent plastic plate an outline of commissural opening of the valve enclosed below was drawn by a marker. Each of subsequent valves was compared to the received contour leveling them on hinge plate. If contours do not coincide (excepting the sizes), a new contour from a different specimen was drawn. In case of an intermediate form a valve was sorted to the closest of the basic types.

Beside the shell shape we analyzed variability of some other parameters: a number of radial ribs on the surface of valves and their ornamentation, a quantity of chevrons on the ligament area, a shape of the hinge plate and a number of hinge teeth.

Length of shells was determined on graph paper, their thickness was measured by caliper at the middle part of the ventral edge. Lock studying and calculation of a number of ribs and chevrons was carried out with an optical stereomicroscope MBS–9. Photos of shells are taken with "Canon Power Shot SX 120" camera.

Results and discussion

According to our observations *Anadara inaequivalvis* in the Black-Azov Sea Basin possesses wide variability of a shell (fig. 2). Various degree of variability is characteristic for its shell shape and thickness, shape of the hinge plate, number, shape and the relative size of hinge tooth, quantity and surface texture of the radial ribs, prevailing color of the shell and other features.

The most indicative, in our opinion, is the analysis of variability of a shell shape, whereas other properties in a context of this research are considered to be minor and are discussed in fewer details.

Usually the conchological variability is estimated with the aid of a verbal description and/or quantitative parameters. However, in most cases the patterns and limits of shell variability can be exhibited with images much more clearly. In the research presented we used a visually selected set of the main types of outline of *Anadara* shell valves joining (= locking) which is called here "forms" (fig. 3). Numbering of these forms, i. e. certain types of a contour of the shell commissural opening is selected arbitrarily and used only to substitute the subjective verbal equivalents, such as "orbicular", "ovate-trapezoid", "rounded-tetragonal", etc. However, in the discussion of qualitative and quantitative characteristics of particular forms we are compelled to use also similar statements (see below).

Within the studied samples of *Anadara* from the Black-Azov Sea Basin we define six basic types of the shell commissural opening (fig. 3). The form 4 exhibits the highest rate of occurrence, whereas extreme forms occur rarely. Comparison of two large samplings of the Black and the Azov seas (see Material and methods) shows that in both localities the form 4 predominates, being the first dominant; the second dominants are forms 2 and 1 at the Azov Fedotova Spit and forms 2 and 3 at the BSBR. Occurrence frequency of other forms in both samplings differs considerably (fig. 4). We explain this as follows. The dominant form, i. e. the form 4 (non-equilateral trapezoid), represents a basic conchological morphotype, generated here on the basis of initially introduced individuals whereas other forms are its morphological (autochthonous) variants. The relations between all defined forms can be expressed schematically (fig. 5) in two morphological ranges. The first range 4–2–1–3 reflects a gradual reduction of shell height and its relative lengthening; in the form 3 it combines with rounding of anterior edge and elongation of posterior one. The second line 4–6–5 demonstrates a transition from the basic morphotype 4 to the form 6 by shortening of posterior edge (the contour of commissural opening comes nearer to an equilateral trapezoid) and further to the form 5, an opening of which is almost roundish caused by subsequent increasing of relative height of a shell. Herewith a hinge plate in form 5 is considerably shortened that makes it markedly arcuate.

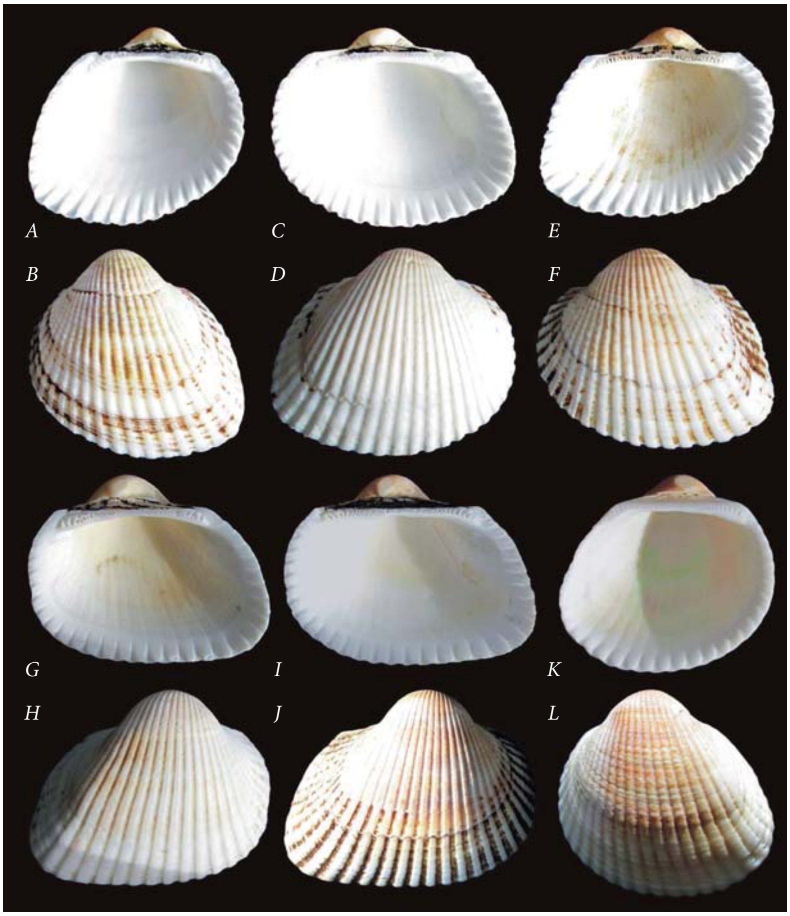


Fig. 2**.** Shells of *A. inaequivalvis* from the Black Sea (*G–L*) and the Sea of Azov (*A–F*): *A–F* — specimens from the northwestern part of the Sea of Azov (Fedotova Spit); *G–L* — specimens from the northwestern part of the Black Sea (Cordon "Morskoj", the BSBR). *A*, *C*, *E*, *G*, *I, K* — inner side of the valves; *B*, *D*, *F*, *H*, *J*, *L* — outer side of the same specimens.

Рис. 2. Раковины *A. inaequivalvis* из Чёрного и Азовского морей: *A–F* — экземпляры с северо-западного побережья Азовского моря (Федотова коса); *G–L* — экземпляры с северного побережья Чёрного моря (кордон «Морской», ЧБЗ). *A*, *C*, *E*, *G*, *I, K* — внутренняя сторона створок; *B*, *D*, *F*, *H*, *J*, *L* — наружная сторона тех же экземпляров.

It should be stressed that forms discussed here can not be considered as discrete states, and no taxonomic status might be assigned to them. Although the intermediate variants make an insignificant part of the material studied, their existence evidences a smooth (continuous) variability. Existence of transitional forms allows to consider *Anadara* successfully making them at home in the Black and the Sea of Azov belonging to one species with wide morphological variability but not to several distinct "narrow" species. It corroborates with extremely low probability of invading into the Mediterranean basin (one-time occasion or repeatedly in to the Adriatic, the Black Sea and the Sea of Azov), 2–3 allied but different species of *Anadara*. Finally, a dispersion of domination order of conchological morphotypes revealed in the compared samplings of *A. inaequivalvis* means an independent existence of these populations and only reflects particular characteristics of local conditions of their habitation.

Dimensional characteristics of *A. inaequivalvis* shell occurring in the Adriatic Sea and in the Black-Azov Sea Basin differ significantly. The length of this species shell in the Adriatic Sea reaches up to 70–75 mm, maximally even 80 mm (Rinaldi, 1985). The mollusks living in the Black Sea and in the Sea of Azov are much smaller (Anistratenko et al., 2011). The largest shell from our materials is of 65.0 mm length (table 1), but quantitatively dominate

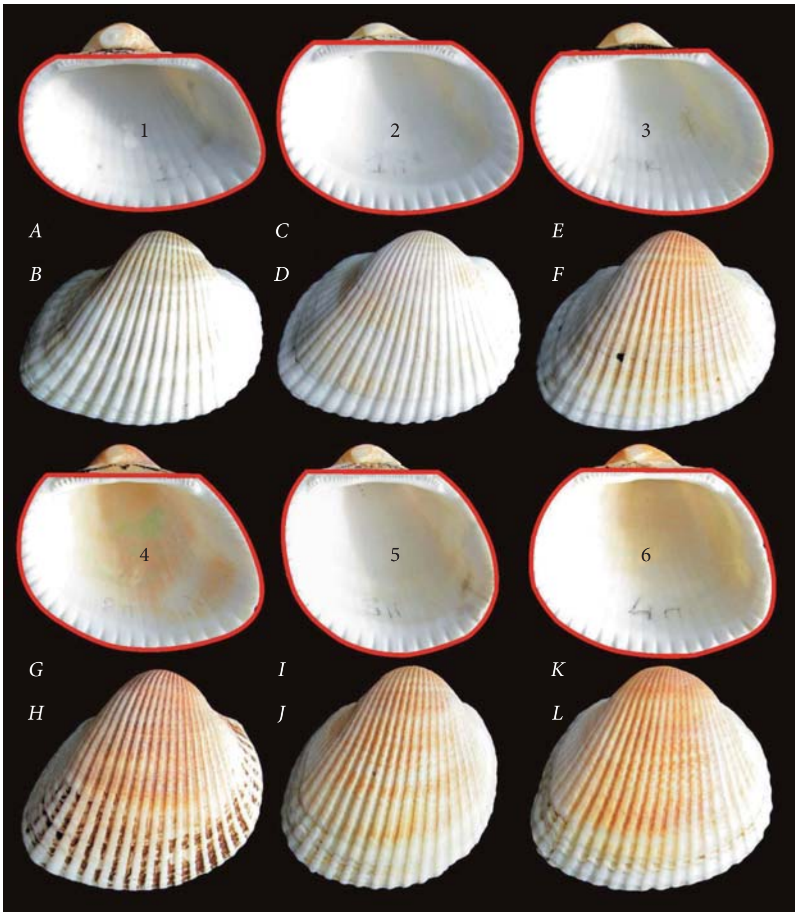


Fig. 3. Basic forms of the shell shape i. e. commissural opening in *A. inaequivalvis* from the Black Sea and the Sea of Azov. *A*, *B* — form 1; *C*, *D* — form 2; *E*, *F* — form 3; *G*, *H* — form 4; *I*, *J* — form 5; *K*, *L* — form 6. All specimens — from the BSBR. Numeration is selected arbitrarily, explanations see in the text.

Рис. 3. Основные формы комиссурального просвета раковины *A. inaequivalvis* из Чёрного и Азовского морей на примере правой створки. *A*, *B* — форма 1; *C*, *D* — форма 2; *E*, *F* — форма 3; *G*, *H* — форма 4; *I*, *J* — форма 5; *K*, *L* — форма 6. Все экземпляры из ЧБЗ. Нумерация форм произвольная, пояснения в тексте.

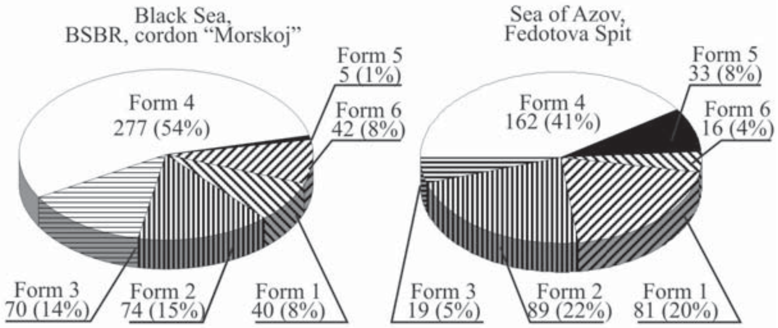


Fig. 4. A ratio of basic types of the shell shape in *A. inaequivalvis* from the Black Sea and the Sea of Azov. Enumerated forms correspond to those in the text discussed; the first symbol specifies an absolute number of valves in the sample, the second symbol means a percentage share of this form in the sample.

Рис. 4. Соотношение основных вариантов изменчивости раковины *A. inaequivalvis* в пробах из Чёрного и Азовского морей. Нумерованные формы соответствуют таковым, обсуждаемым в тексте; первая цифра обозначает абсолютное количество створок данной формы в пробе, вторая — доля этой формы в процентах.

Table 1. Morphological characters of the shells *A. inaequivalvis* from the Black Sea and the Sea of Azov (dimensions are given in millimeters)
Таблица 1. Морфологические характеристики раковин *A. inaequivalvis* из Чёрного и Азовского морей (линейные промеры приведены в миллиметрах)

N	Left/Right valve (L/R)	Morpho-type of the shell	Length of the shell mean (min–max)	Number of radial ribs mean (min–max)	Number of chevrons mean (min–max)	Thickness of the shell wall mean (min–max)	Number of teeth mean (min–max)
Cordon "Morskoj", the Black Sea Biosphere Reserve, Gola Prystan District, Kherson Region, Ukraine							
13	R	1–6	38.5 (20–53)	34.1 (32–36)	1.9 (1–3)	1.9 (1.0–2.6)	44.2 (39–50)
7	L	1, 3, 4, 5	37.6 (10–57)	33.4 (30–35)	1.9 (0–3)	1.9 (0.4–2.5)	43.3 (27–55)
Coast of the Caucasus near Pichory Village, the Black Sea (Gali district, Abkhazia)							
6	R	2, 4, 6	35.0 (22–48)	34.6 (33–36)	1.5 (1–2)	1.6 (1.0–2.1)	46 (35–53)
7	L	2, 4, 6	34.7 (22–52)	34.7 (32–36)	1.6 (1–3)	1.7 (1.2–2.3)	45.9 (40–53)
Fedotova Spit near Kirillovka settlement, the Sea of Azov (Akimovka District, Zaporozh'e Region, Ukraine)							
13	R	1–4, 6	34.1 (23–43)	32.2 (31–35)	1.4 (1–2)	1.5 (1.1–2.1)	40.5 (32–51)
18	L	1–4, 6	35.5 (26–45)	32.5 (31–34)	1.4 (1–2)	1.9 (1.3–2.9)	40.4 (32–48)
Coast of the Kerch Peninsula, the Sea of Azov (Yurkino settlement, Lenino District, Crimea, Ukraine)							
1	L	2	65	34	4	3.1	56
Kerch Strait, Tuzla Spit (Crimea, Ukraine)							
1	R	2	48	34	2	1.6	46
2	L	2, 4	54.5 (53–56)	33.5 (33–34)	2	2.25 (2.1–2.4)	48 (46–50)
Kerch Strait, Ak–Burun Cape (Crimea, Ukraine)							
2	R	2, 3	39.5 (38–41)	34	2	1.5 (1.4–1.6)	44 (38–50)
2	L	4	49.5 (49–50)	34 (33–35)	2 (1–3)	2.45 (2.3–2.6)	48.5 (45–52)
Kerch Peninsula, Opuk Cape, the Black Sea (Crimea, Ukraine)							
5	R	1–4	52.4 (47–56)	35 (33–37)	2.4 (1–3)	2.3 (2.0–2.7)	49.4 (43–56)
7	L	1, 2, 4	50 (33–61)	33.6 (33–35)	2.3 (1–3)	2.3 (1.3–3.0)	50.1 (46–54)

valves reaching about 40 mm in length. Meanwhile, according to K. A. Lutaenko (2006) maximum length of *A. inaequivalvis* shell in the southern India is 66 mm which is comparable to that of the Black Sea *Anadara*.

Among the other features of *Anadara* shell, number of radial ribs on surface of valves, number of chevrons on a ligament area, hinge plate shape, number and peculiarities of hinge teeth location have essential value for the correct specific identification (table 1). Also, one of the determinative features of anadarins is valve-inequality; at least, in the figures of *Anadara inaequivalvis* group presented in works of J. Chemnitz and L. Reeve, this character is expressed distinctly (Lutaenko, 2006: 113, fig. 5). It is significant that inequivalvity in *Anadara* individuals from the Black and the Azov Seas is barely visible — a ventral spacing between the valves of adult specimens does not exceed 2 mm (fig. 6, *C–F*).

The number of radial ribs on valve surface of the specimens studied varied from 30 to 36. Some distinctions of this characteristic were revealed in shells from different localities (table 1). Upon the average the shells from the Black Sea bear 1–2 ribs more than those from the Sea of Azov and possess somewhat wider limits of variation of this character (fig. 7).

As our material shows, the sculpture of ribs — their granularity in the middle and the anterior parts of the shell is more developed on the left valve (fig. 6, *A*, *B*). However, the right valves also have the expressed rugosity of ribs formed by thin transversal ribs. Perfectly smooth look only ribs of the valves worn enough. On a photo of *A. inaequivalvis* shells from the southern India provided by K. A. Lutaenko (2006: table 6, A, B, E, F) the surface of ribs is absolutely lacking rugosity; the author of the article draws attention to this fact also in the text (Lutaenko, 2006: 114).

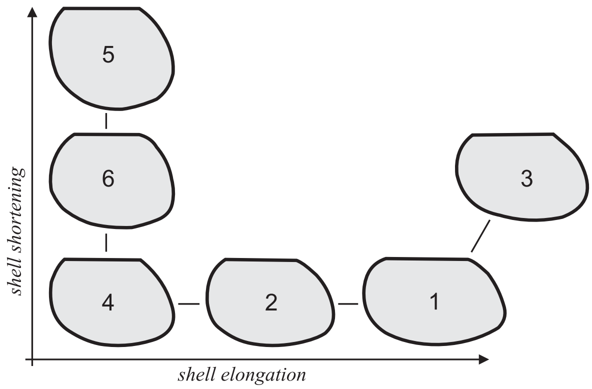


Fig. 5. Morphological ranges of basic types of the shell shape in *A. inaequivalvis* from the Black-Azov Sea Basin. Outlines of the shell commissural opening are given in the same scale. The form 4 is defined as initial for all other modifications presented.

Рис. 5. Морфологические ряды основных форм *A. inaequivalvis* из Азово-Черноморского бассейна. Контуры комиссурального просвета раковины приведены к одному масштабу. Форма 4 определена в качестве исходной для всех остальных вариантов изменчивости.

There are 1 to 4 chevrons on a ligament area of *Anadara* from the Black-Azov Sea Basin; usually two of them are available. The number of chevrons partly depends on the shell size though this dependence apparently is not a direct one. Thus, a specimen of 65 mm length has four chevrons while the majority of valves of different size classes have either 1 or 2 chevrons (table 1). No any correlation between the number of chevrons and the morphotype of the commissural opening was registered.

Hinge plate of *Anadara* studied is almost straight, only specimens with relatively shorter shell (forms 5 and 6) possessed the plate in a shape of a slightly curved arch (see above). The number of hinge teeth of equally-sized shells (i. e. having the similar age) is not con-

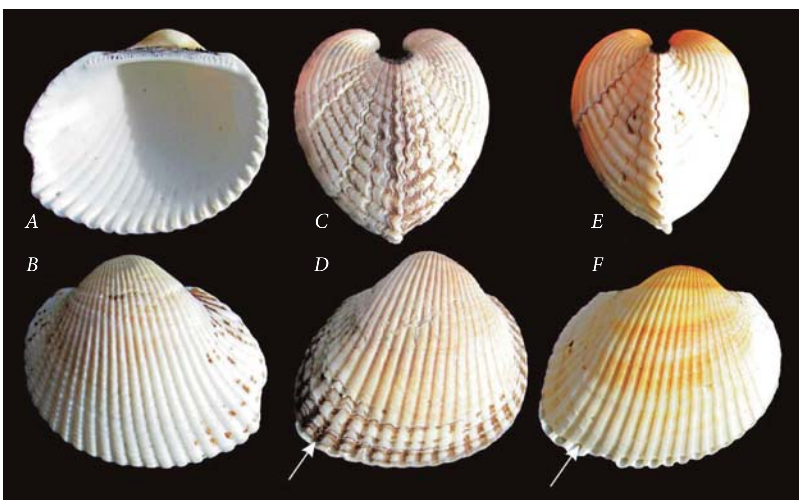


Fig. 6. Morphology of the shell *A. inaequivalvis* from the Black-Azov Sea Basin: *A, B* — left valve with well-sculptured radial ribs (Caucasus coast near Pichory village, Abkhazia); *C–F* — inequivalvity in adult shells: *C, D* — specimen from the Sea of Azov, Fedotova Spit, *E, F* — specimen from the Black Sea, cape Opuk. Arrows indicate the line of valves occlusion.

Рис. 6. Морфология раковины *A. inaequivalvis* из Азово-Черноморского бассейна: *A, B* — левая створка с хорошо выраженной скульптурой на поверхности радиальных рёбер (побережье Кавказа у с. Пичори, Абхазия); *C–F* — неравностворчатость взрослых раковин: *C, D* — экземпляр из Азовского моря, Федотова коса, *E, F* — экземпляр из Чёрного моря, м. Опук. Стрелки показывают линию смыкания створок.

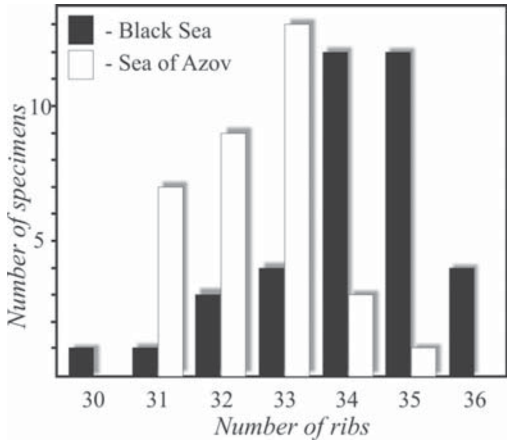


Fig. 7. The number of radial ribs in *A. inaequivalvis* from the Black Sea and the Sea of Azov.

Рис. 7. Количество радиальных рёбер *A. inaequivalvis* из Чёрного и Азовского морей.

stant; the increase of the shell size usually led to the increase of the number of teeth. Thus, the shell 10 mm long was supplied with 27 teeth, lock of the shell 35–40 mm long bore from 37 to 49 teeth, and in specimens with length over 45 mm we registered from 44 to 56 teeth (table 1). On hinges of the Sea of Azov specimens (and more rarely those of the Black Sea) some anomalies of teeth were revealed: on posterior edge, and sometimes on anterior edge of the teeth the series up to 2–3 teeth merged in one tooth (fig. 2, *G*); also teeth of irregular shape as calluses, instead of normal plates were sometimes observed.

In addition, judging by the illustrations presented by K.A. Lutaenko (2002: 38, fig. 5), variability of the shell shape of *A. inaequivalvis* from the Holocene deposits of Peter the Great Bay (northwestern Sea of Japan) demonstrated similar patterns with those revealed in the Black-Azov Sea Basin (data presented here).

Comparison of morphological types of *Anadara* shells from the Black Sea and the Sea of Azov on the one side, and *A. inaequivalvis* inhabiting the southeast India on the other side, shows the following : the most "popular" morphotype among the *Anadara* from the Black–Azov Sea Basin (form 4) demonstrates a strong resemblance to *A. inaequivalvis* of Coromandel Coast of India. All images of this species shells from the type locality given by K. A. Lutaenko (2006, phototable 3, E–I; phototable 6, A–H,) fit well to variability limits of *Anadara* from the Black Sea and the Sea of Azov. Shells of *A. inaequivalvis* from Romania (Lutaenko, 2006, phototable 11, E–H) by a contour of commissural opening also correspond well to the form 4; and shells from the Adriatic Sea (Lutaenko, 2006, phototable 11, A–D) correspond to the form 1. Concerning the number of a shell radial ribs *A. inaequivalvis* from southern India, bearing from 31 to 36 and usually 33–35 (Lutaenko, 2006), does not exceed variability limits of this character in mollusks from the Black and Azov seas (table 1; fig. 7).

Thereby, a conspecifity of at least one of alien *Anadara* nominal species known in the Mediterranean Basin (Morello, Solustri, 2001; Morello et al., 2004 for records of *Anadara demiri* in the Adriatic Sea) to *A. inaequivalvis* can be considered as properly grounded. To verify this decision more data on variability of this species within its native area are to be obtained as well as the molecular and genetic analyses are to be completed.

Conclusion

The present study shows a wide morphological variability of *A. inaequivalvis* shell characters in the Black-Azov Sea Basin, i. e. far beyond of this species native area. Thereby, the invader species realizes its adaptive abilities and apparently grow roots here in the newly occupied region of the World Ocean.

The existence of intermediate forms proves a smooth (continuous) variability of the shell and belonging of all the studied populations to the same species. Revealed distinctions in a quantitative ratio of morphotypes in compared samples of *A. inaequivalvis* mean independent existence of these populations and reflect particularities of local living conditions.

From the taxonomic point of view the data obtained probably allow to identify *Anadara* inhabiting the Black-Azov Sea Basin as *A. inaequivalvis*, since they correspond to *A. inaequivalvis* from the type locality. For more tenable decision the molecular and genetic analyses of as more as possible number of Anadarinae species should have a crucial importance.

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